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Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 4116 (1988): wooden shelving cabinets (adjustable type)
-Specification [CED 35: Furniture]



“ज्ञान से एक नये भारत का निर्माण”

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“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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IS : 4116-1988

(Reaffirmed 1993)

REAFFIRMED

2007

Indian Standard

SPECIFICATION FOR
WOODEN SHELVING CABINETS
(ADJUSTABLE TYPE)

(Second Revision)

First Reprint SEPTEMBER 1997

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BUREAU OF INDIAN STANDARDS
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**AMENDMENT NO. 1 JANUARY 1992
TO
IS 4116 : 1988 SPECIFICATION FOR WOODEN
SHELVING CABINETS (ADJUSTABLE TYPE)**

(Second Revision)

(Page 2, clause 2.5) — Insert the following new clause after 2.5 and renumber the subsequent clauses accordingly:

“2.6 Medium Density Fibre Board (MDF) — MDF used in the manufacture of all components except plinth or pedestal of wooden shelving cabinet (adjustable type) shall conform to IS 12406 : 1988 ‘Specification for medium density fibre boards for general purposes’, shall be of Interior Grade IGSB if air drying finishes are adopted and Exterior Grade EGSB, if oven drying finishes are adopted.”

(Page 2, clause 4.1.1, line 3) — Insert the words ‘or MDF’ after the word ‘blockboard’.

(Page 3, clause 4.1.3, line 4) — Insert the words ‘or MDF’ in the beginning of the line.

(Page 3, clause 4.1.5, line 3) — Insert the words ‘or MDF’ after the word ‘blockboards’.

(CED 35)

**AMENDMENT NO. 2 FEBRUARY 1997
TO
IS 4116 : 1988 SPECIFICATION FOR WOODEN
SHELVING CABINETS (ADJUSTABLE TYPE)**

(Second Revision)

(Page 1, clause 0.3) — Insert the following new clause after 0.3 and renumber the subsequent clause:

"0.4 A scheme of labelling environment friendly products to be known as ECO Mark is being introduced at the instance of the Ministry of Environment and Forests (MEF), Government of India. The ECO Mark shall be administered by the Bureau of Indian Standards (BIS) under the *BIS Act*, 1986 as per the Resolution No. 71 dated 21 February 1991 published in the Gazette of the Government of India. For a product to be eligible for ECO Mark, it shall also carry the Standard Mark of the BIS, besides meeting additional optional environment friendly requirements."

(Page 1, clause 2.1) — Insert the following at the end of the clause:

'For ECO Mark, the particle board shall conform to the requirements specified in IS 3087 : 1985* for ECO Mark purposes.'

(Page 1, clause 2.2) — Insert the following at the end of the clause:

'For ECO Mark, the veneered particle board shall conform to the requirements specified in IS 3097 : 1980† for ECO Mark purposes'.

(Page 1, clause 2.3) — Substitute the following for the existing clause:

"2.3 Plywood — Plywood used shall conform to IS 303 : 1989 'Specification for plywood for general purposes (*third revision*)'.

2.3.1 For ECO Mark the plywood shall conform to the requirements specified in IS 303 : 1989 for ECO Mark purposes."

(Page 1, clause 2.4) — Insert the following at the end of the clause:

"For ECO Mark, the blockboard shall conform to the requirements specified in IS 1659 : 1990 'Specification for blockboards (*third revision*)' for ECO Mark purposes."

(Page 1, clause 2.5) — Substitute the following for the existing clause:

Amend No. 2 to IS 4116 : 1988

“2.5 Timber — Any species of timber specified in IS 13622 : 1993 ‘Indian timber for furnitures and cabinets — Classification’ shall be used in the manufacture of cabinets.

2.5.1 For ECO Mark, only species of timber as specified in IS 13622 : 1993 from sources other than natural forests such as timber from industrial and social forestry plantations, shade trees from tea and coffee estates, etc, shall be used for the manufacture of cabinets.”

(Page 2, clause 2.6, see also Amendment No. 1) — Insert the following at the end of the clause:

‘For ECO Mark, the medium density fibreboard shall conform to the requirements specified in IS 12406 : 1988 for ECO Mark purposes.’

(Page 5, clause 9) — Insert the following new clause after 9 and renumber the subsequent clauses:

‘10 ADDITIONAL REQUIREMENTS FOR ECO MARK

10.1 General Requirements

10.1.1 The product shall conform to the requirements of quality and performance as specified in the standard.

10.1.2 The manufacturer shall produce to BIS environmental consent clearance from the concerned State Pollution Control Board as per the provisions of the *Water (Prevention and Control of Pollution) Act*, 1974 and *Air (Prevention and Control of Pollution) Act*, 1981 alongwith the authorization, if required under the *Environment (Protection) Act*, 1986, while applying for ECO Mark.

10.2 Specific Requirements

The product shall conform to the specific requirements given for ECO Mark under relevant clauses of this standard.

NOTE — The manufacturer shall provide documentary evidence by way of certificate or declaration to this effect to the Bureau of Indian Standards while applying for ECO Mark.’

(Page 6, clause 12.1.1) — Insert the following at the end of the clause:

‘12.2 The criteria for which the product has been labelled as ECO Mark .’

(CED 35)

Indian Standard

SPECIFICATION FOR WOODEN SHELVING CABINETS (ADJUSTABLE TYPE)

(*Second Revision*)

0. FOREWORD

0.1 This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards on 13 October 1988, after the draft finalized by the Furniture Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 This standard was first published in 1967 and subsequently revised in 1976. In this revision, performance requirements of finish have been included. The revised standard also make reference to the recent Indian standards for various types of materials allowed in the standard.

0.3 This standard contains clauses 4.3 and 8.1 which permit the purchaser to use his option for

selection to suit his requirements and clause 10.1 which requires the purchaser to supply some technical information at the time of placing order.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Rules for rounding off numerical values (revised).

1. SCOPE

1.1 This standard covers the requirements for materials, sizes, construction and finish of adjustable wooden shelving cabinets with hinged doors.

2. MATERIALS

2.1 Wood Particle Board — Wood particle board required for the manufacture of wooden shelving cabinets shall conform to IS : 3087-1985*, and shall either be the flat-pressed single-layer or flat-pressed 3-layer type. Wood particle board used for wooden shelving cabinets which require baking paints or enamel finishes shall be manufactured with only BWR type of adhesives, such as, phenol formaldehyde.

2.2 Veneered Particle Board — Veneered particle boards shall conform to IS : 3097-1980†. Both interior and exterior grades of veneered particle boards can be used where cabinets are to be finished with air-drying paints or varnishes. Where oven baking paints, enamel or varnishes are to be used, only exterior grade veneered particle boards shall be used.

*Specification for wood particle boards (medium density) for general purposes (first revision).

†Specification for veneered particle boards (first revision).

2.3 Plywood — Plywood, used in the manufacture of wooden shelving cabinets shall conform to IS : 303-1975*. Any of the three grades, namely, BWR, WWR and CWR of plywood may be used for cabinets which are to be finished with air-drying paints, enamel or varnishes. Where cabinets are finished with oven-drying paints, enamel or varnishes, only BWR grade of plywood shall be used. The plywood used shall not be inferior to Type B. In case veneered plywood is used, it shall conform to IS : 1328-1982‡.

2.4 Blockboards — Blockboard used in the manufacture of wooden shelving cabinets shall conform to IS : 1659-1979‡ and shall be of Grades 1 or 2, where air-drying finishes are adopted and Grade 1 only where oven-drying finishes are adopted in the manufacture of cabinets.

2.5 Solid Wood Components — Any of the species of timber recommended for furniture and cabinet making in IS : 399-1963§ shall be used in the manufacture of wooden shelving cabinets.

*Specification for plywood for general purposes (second revision).

‡Specification for veneered decorative plywood (second revision).

‡Specification for blockboards (second revision).

§Classification of commercial timbers and their zonal distribution (revised).

The wood used shall be seasoned timber, with the moisture content as permissible for different climatic zones in IS : 287-1973*. The specification of wood shall conform to IS : 1331-1977†. Preservative treatment shall be given to the concealed components of non-durable wood and sap wood of durable wood in accordance with IS : 401-1982‡.

2.6 Adhesive — Adhesive used for joinery work shall conform to IS : 849-1957§, IS : 851-1978 ||, IS : 852-1969¶ or IS : 4835-1979**.

2.7 Wood Screws — Wood screws shall conform to IS : 6760-1972††.

2.8 Mirror — Mirror shall conform to IS : 3438-1977‡‡.

2.9 Paints, enamels polish and varnish shall conform to the relevant Indian Standards, wherever they exist for air-drying as well as stoving finishes.

3. DIMENSIONS AND TOLERANCES

3.1 The overall dimensions of shelving cabinets shall be as given in Table 1 (see also Fig. 1).

3.2 Tolerances — The overall dimensions specified in 3.1 shall not vary by more than ± 5 mm.

4. FABRICATION

4.1 Components — The wooden shelving cabinets shall be first made in component forms and assembled from the components as given in 4.1.1 to 4.3.3.

4.1.1 Sides — The sides shall be made from wood particle boards, or veneered particle boards, or plywood, or blockboard as specified in 2 having a thickness of 20 ± 1 mm and shall be prepared for joinery and fixtures as required. The width of the side shall correspond to the width of the top. The side shall extend between the extreme surfaces of the top, the bottom and the back. For front, it may extend to full front where doors are to be inside with front bordered construction or be short

*Recommendations for maximum permissible moisture content for timber used for different purposes (second revision)

†Specification for cut sizes of timber (second revision).

‡Code of practice for preservation of timber (third revision).

§Specification for cold setting casein glue for wood.

|| Specification for synthetic resin adhesives for construction work (non-structural) in wood (first revision).

¶Specification for animal glue for general wood-working purposes (first revision).

**Specification for polyvinyl acetate dispersion-based adhesives for wood (first revision).

††Specification for slotted countersunk head wood screws.

‡‡Specification for silvered glass mirrors for general purposes (first revision).

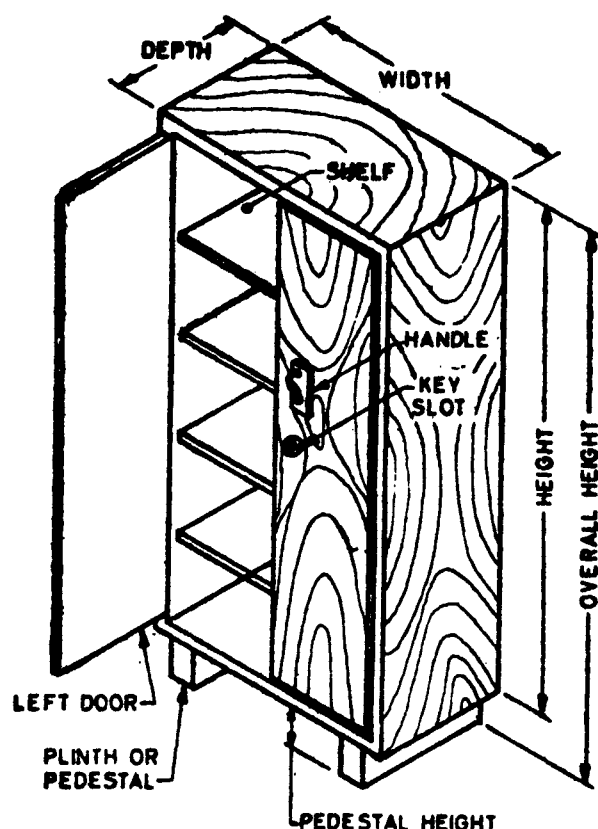


FIG. 1 TYPICAL SKETCH OF A WARDROBE

TABLE 1 OVERALL DIMENSIONS OF SHELVING CABINET

(Clause 3.1 and Fig. 1)

All dimensions in millimetres.

SL No.	DIMENSIONS	SMALL SIZE	LARGE SIZE
(1)	(2)	(3)	(4)
i)	Height	1 280	1 980
ii)	Width	760	910
iii)	Depth	430	480

NOTE — The minimum clearance required for shelving cabinets to be put into recesses or openings, where required, shall be as follows:

a) For top of cabinet	20
b) For each side of cabinet	10
c) For depth of cabinet	5

of the thickness of doors where doors extended to full width.

4.1.2 Backs — The backs shall be made from wood particle board, veneered particle board, plywood or blockboard as specified in 2 and shall be of thickness not less than 10 ± 1 mm. It shall be one piece panel prepared for joinery. The width of the back panel shall correspond to the length of the top panel and the length shall extend between the extreme surfaces of the top and the bottom shelves.

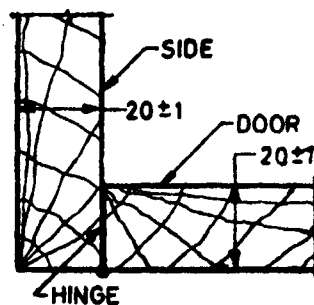
4.1.3 The top, bottom and the shelves shall be made from wood or wood particle boards, veneered particle boards, plywood or blockboard as specified in 2 and shall be of thickness 20 mm with a tolerance of ± 1 mm. For loads higher than as given in Table 2, the thickness of the shelves shall either be increased to 25 mm or a suitable additional bracket shall be provided to support the shelf in the centre from the back of the cabinet. The length of the top and the bottom shall cover the width of the cabinet adjusted for the joinery and shall cover the depth including the thickness of the door and allowance for joinery work. The depth of the shelves shall be equal to the clear depth of the cabinet after fixing the doors in position.

4.1.4 Shelf Brackets — The shelf brackets shall be prepared for supporting shelves. The

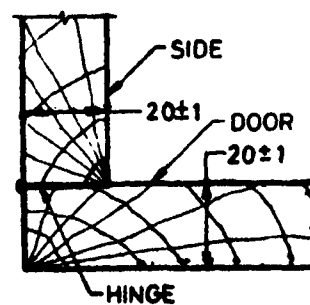
brackets shall be made of either metal sheet not less than 1.6 mm thick or solid wood reapers with dowel pins fixed on to them. The bracket shall be so designed and constructed that the shelf is securely supported and adjustment inside the bracket can be effected easily.

4.1.5 Doors — The door shall be made of wood particle board, veneered particle boards, plywood or blockboards as specified in 2 and shall be of thickness 20 mm with a tolerance of ± 1 mm. The doors shall be prepared to fit the size of the cabinet and any of the following two methods shall be used:

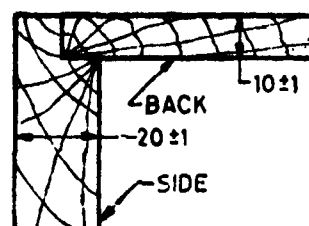
- Door fixing recessed with the side, top and bottom front form as border and hinges fixed on inside surface of sides; or
- Door fixing on the full front with the hinges on the sides front edge.



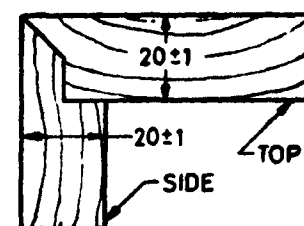
2a Recessed Door Shutter



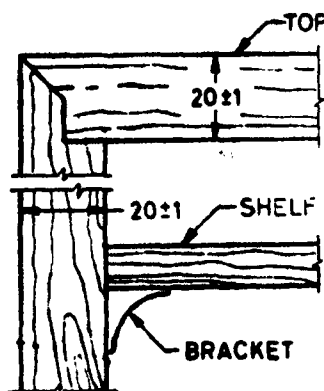
2b Full Front Door Shutter



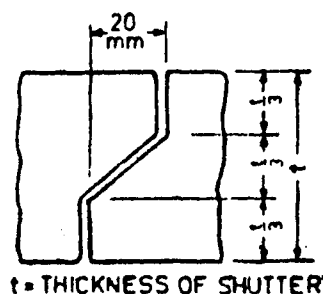
2c Joint Between Side and Back



2d Joint Between Side and Top



2e Detail of Adjustable Shelf



2f Meeting Stiles

All dimensions in millimetres.

FIG. 2 TYPICAL JOINERY DETAILS

4.1.5.1 Dimensions of the side and the door shall be adjusted to suit any of the methods (a) or (b).

4.1.5.2 Meeting stiles — The doors shall be in 2-leaf construction with rebate cut at the centre meeting. The rebate shall be 20 mm. Where lipping is provided, the depth of the lipping at the place of the rebate shall be not less than 20 mm. The rebate shall be splayed type.

4.1.6 The edges of the sides, the shelves, the bottom, and the top of the doors shall be prepared either by internal lipping or external lipping or filling with suitable wood putty or other suitable material to give proper finish and ability to stand for wear of the edges and take necessary fixtures. The components shall also be given filler and under-coat paint so as to be ready for final paint and finishing treatment.

4.2 Joinery — The joinery shall be generally as described in Appendix A of IS : 3087-1985*. The joining of the sides to the top and bottom shall be either by splined-miter joint or inter-locked miter joint or straight miter joints fixed by screws driven angularly or supported by wood strip, or by butt joint with or without dowels or half-lapped joining. Typical details of joints are shown in Fig. 2. The joints shall be well secured by glue and suitable wood screws, for tight and strong fit. Wherever applicable, joints shown in IS : 3845-1966† shall be followed for various locations.

4.2.1 The back shall be fixed on the sides, top and bottom by straight butt joint recessed by half-lap cut and secured by glue and wood screws. Alternatively, it shall be fixed by double half-lapped joint or straight butt and secured by glue and wood screws. In the latter case, adjustment shall be made in the width of sides, top and bottom.

4.2.2 The sides of the cupboard shall be prepared with bracket holding recesses for adjustment of brackets for shelves. The shelves shall be adjustable and securely supported on all the four corners. The brackets shall be so designed and constructed that the shelf is securely supported and that the adjustment of the bracket can be effected. Alternatively, metal strips on each corner of the inside of the two sides with holes every 50 mm of height for taking brackets of shelves shall be provided.

4.3 Doors — The doors shall be fixed to the sides internally or externally and by use of either continuous (piano) hinges or three-number hinges, each 75 mm long and to suit the width of fixing edge, by use of suitable wood screws. The cabinet may be right door first opening or left

door first opening as desired by the purchaser. The door other than the first opening door shall have bolts fixed on its inner side at the top and bottom to fix it to the top and bottom components. The door shall be provided with suitable almirah locks on the first opening door and suitable lock plate on the other door. The lock shall be internally fixed and the key hole provided in the door shall have excutcheon plate. The door shall also be provided with suitable almirah door handles.

4.3.1 The clearance around the door between the sides, top and bottom shall be not more than 1.25 mm.

4.3.2 Hinges — The hinges shall conform to IS : 1341-1981*, IS : 3818-1986† and IS : 205-1978‡.

4.3.3 Pedestals shall be made from solid wood 100 mm high and 65 mm wide and shall be screwed on to the bottom securely by use of suitable screws driven to the bottom of the pedestal in length not less than 50 mm and spaced not more than 150 mm apart.

5. ASSEMBLY

5.1 The various components shall be assembled by means of glue and screws securely fixed under pressure. Before driving screw, pilot hole shall be driven into the wood panel and the screw shall be dipped in glue before driving in.

6. ADDITIONAL ACCESSORIES

6.1 The following additional accessories may be provided, if so desired by the purchaser:

- a) *Hanging Rod* — This shall be of mild steel or aluminium tubular pipe with a wall thickness of not less than 1.60 mm and 20 mm in diameter. This shall be nickel or chromium plated conforming to IS : 1068-1985§ or anodized in the case of aluminium and fitted to the sides of the cabinet lengthwise with suitable brackets. The rod may also be of wood turned to 20 mm diameter.
- b) *Mirror* — The mirror shall be not less than 5 mm thick. It shall be of sizes 1250 × 300 mm or 400 × 300 mm as specified in IS : 6184-1971|| and shall be of plate glass. Mirror shall be fixed with suitable fixtures with or without beading.

*Specification for steel butt hinges (fourth revision).

†Specification for continuous (piano) hinges (second revision).

‡Specification for non-ferrous metal butt hinges (third revision).

§Specification for electroplated coatings of nickel plus chromium and copper plus nickel plus chromium on iron and steel (second revision).

|| Dimensions for furniture mirrors.

*Specification for wood particle boards (medium density) for general purposes (first revision).

†Code of practice for joints used in wooden furniture.

7. LOADING

7.1 The maximum static loads uniformly distributed and applied on the shelves may not exceed those given in Table 2. The loads may be taken as a guide in ordering shelves.

TABLE 2 SAFE DISTRIBUTED LOADS FOR SHELVES FOR SHELVING CABINET
(Clauses 4.1.3 and 7.1)

WIDTH mm	DEPTH mm	LOAD N
(1)	(2)	(3)
760	430	1 850
910	480	1 500

8. FINISH

8.1 Wood Panel Components — Wood panel components shall be given a coat of primer paint and filler. Wood putty shall be applied to all the surfaces requiring filling and shall conform to the IS : 419-1967*.

After preparing the surfaces, two coats of enamel or paint, that is, one under-coat and one finishing coat shall be given. Alternatively, the surfaces may be stained and polished. The finishing coat shall be synthetic air-drying enamel or stoving enamel for wood work. The enamel or paint shall be of exterior type and of a finish and colour as required by the purchaser.

8.1.1 In case of stoving enamels or paints, the components of the finished cabinets shall be stored at suitable temperature and for suitable time as advised by the manufacturer of the enamel.

8.2 The finish shall be smooth, uniformly applied and free from visible defects. It shall be well based and shall not readily chip or flake. The dry film thickness shall be not less than 0.10 mm.

8.3 All other components shall be finished in colour as agreed to between the purchaser and the manufacturer.

9. PERFORMANCE REQUIREMENTS OF FINISH

9.1 Every shelving cabinet shall be checked for good workmanship and shall be free from any stain and warp.

9.2 Resistance of the Surface to Dry Heat — The surface of the wooden cabinet shall be tested for resistance to dry heat in accordance with IS : 5807 (Part 1)-1975†. The minimum qualifying

*Specification for putty, for use on window frames (first revision).

†Method of test for clear finishes for wooden furniture: Part 1 Resistance to dry heat (first revision).

average rating shall conform to 7 of IS : 5807 (Part 1)-1975*.

9.3 Resistance of the Surface to Wet Heat — The surface of the cabinet shall be tested for resistance to wet heat in accordance with IS : 5807 (Part 2)-1975* and the minimum qualifying average ratings shall conform to 7 of IS : 5807 (Part 2)-1975*.

9.4 Resistance of Surface to Marking By Oils and Fats — The test sample surface shall conform to 5 and 6 of IS : 5807 (Part 3)-1971* when tested in accordance with IS : 5807 (Part 3)-1971*.

9.5 Resistance of Surface to Marking by Liquids — The surface of the test sample shall be tested in accordance with IS : 5807 (Part 4)-1975*. The minimum qualifying average rating shall conform to 8 of IS : 5807 (Part 4)-1975*.

9.6 Resistance of Surface to Mechanical Damage — The surface of the test sample shall be tested for impact, cross-cut and scrape test in accordance with IS : 5807 (Part 6)-1978*. The rating shall conform to 5.3 of IS : 5807 (Part 6)-1978*.

10. INFORMATION TO BE SUPPLIED BY THE PURCHASER

10.1 The purchaser shall supply the following information to the supplier along with the order:

- Whether lock is required or not,
- Whether locker is required or not,
- Number of adjustable shelves required.
- Colour of finish, and
- Where alternative methods of construction and finish are specified, they shall be clearly stated in the order.

11. PACKING

11.1 All the component parts shall be packed in such a way that no damage is caused to them during transit.

11.2 The purchaser may require the cupboard to be supplied in knocked down condition, in which

*Method of test for clear finishes for wooden furniture:

- Part 1 Resistance to dry heat (first revision).
- Part 2 Resistance to wet heat (first revision).
- Part 3 Resistance to marking by oils and fats.
- Part 4 Resistance to marking by liquids.
- Part 6 Resistance to mechanical damage.

case, the manufacturer shall prepare the components fully for quick joining and shall supply complete details and instructions for fixing.

12. MARKING

12.1 All wooden shelving cabinets shall be marked with a suitable mark identifying the manufacturer.

12.1.1 Wooden shelving cabinets may also be marked with the Standard Mark.

NOTE — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard Marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers, may be obtained from the Bureau of Indian Standards.

Bureau of Indian Standards

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards Monthly Additions'.

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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